IN THE UNITED STATES DISTRICT COURT FOR THE
SOUTHERN DISTRICT OF NEW YORK

Midway Manufacturing Company :
vs. :
The Magnavox Company :
and :
Sanders Associates, Inc. :
- - - - - - - - - - - - - - - - -

Continued Deposition
of Ralph H. Baer

74C1030

IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

The Magnavox Company, et al :
vs. :
Bally Manufacturing :
Corporation, et al :
- - - - - - - - - - - - - - - - -

IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF CALIFORNIA

Atari, Inc. :
vs. :
The Magnavox Company :
and :
Sanders Associates, Inc. :
- - - - - - - - - - - - - - - - -

ERNEST W. NOLIN & ASSOCIATES
General Stenographic Reporters
369 ELGIN AVE., MANCHESTER, N. H. 03104
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ORIGINAL

Continued deposition taken pursuant to subpoena and notice at the office of Sanders Associates, Spit Brook Road, Nashua, New Hampshire, on Wednesday, February 11, 1976, commencing at 9:30 o'clock in the forenoon.

PRESENT:

For Midway Manufacturing Company and Bally Manufacturing Corporation:

Donald L. Welsh, Esq.

For Atari, Inc.:

Thomas O. Herbert, Esq.

For Sanders Associates, Inc., and Magnavox Company:

James T. Williams, Esq.

For Sanders Associates:

Louis Etlinger, Esq., and Richard I. Seligman, Esq.

Stenotype Reporter:

Barry G. Nolin, C.S.R.

A. Yes. I didn't find it, but I believe

I N D E X

RALPH H. BAER

called as a witness in behalf of Midway Manufacturing and Bally Manufacturing, being first duly sworn, was examined and testified as follows:

(Interrogatories by Mr. Welsh)

Q. Mr. Baer, yesterday as we closed, we were discussing Exhibit 26-20 which appears to be a monthly status report of project No. NKM dated 11/7/67 indicated as prepared by Mr. Rusch. That refers to a new system concept which has been implemented and says "For more detailed description, see memo No. WTR-11767 by W. T. Rusch. Have you made an attempt to locate that memo?

A. Yes. I didn't find it, but I believe that memo is the

same as Exhibit 9-132 through 173, or at least that a portion of 9-133 to 173 was part of that memo, and the reason why I believe that is the following: in reference 26-20 Rusch talks about a new system which has been implemented which affords cost savings, etc. What he's talking about is his method for spot generation via what he calls a slicer circuits, which was voltage controlled and had some nice features that weren't available on the digital technique before in that by changing the way the circuits were operated, you could also affect the shapes of symbology on the screen. You could have not just rectangles, squares, but also rounded and shaded symbols and donut-shaped signals and cross-shaped signals, which seemed like a very desirable thing to do at the time. Also, at first, the parts value seem to be lower, so as we go through the record, I think it will become obvious that we sort of carried on development work in both the digital scheme, which we talked about yesterday, and Rusch's technique.

Q. You mean the 480 patent?

A. Yes. The 480 patent. I think that if we go through this report and through some of the papers in Exhibit

9, which were done by Rusch about that period that describe his ideas and not only on the circuitry but, also, games associated with them, maybe we'll corroborate my impression that this report is the reference WTR-11767 that we're looking for. That's as close as I can come to identifying that memo.

Q. Now, Exhibit 9-132 states, "Some time ago Ralph Baer thought of generating spots and patterns on normal home TV sets in order to use the sets for various games of action, skill and chance. A working system was constructed and demonstrated and a patent application initiated." Do you recall when the patent application was initiated?

A. I don't recall that.

Q. That doesn't -- the reference to the patent application doesn't help you fix the date of this?

A. No, that must have been the initial application for 480, and isn't that part of the record some place already?

Q. Well, the patent, itself, indicates that the original application on which it was based was filed on January 15, 1968.

A. That's the filing. That's not what Rusch means when

A. he says initiation. It means that I turned papers in to the Sanders patent office sometime prior to his writing this, which was long before the filing date.

Q. What are Exhibits 9-132 through 9-173 attached to?

A. They are attached to 9-139, 9-131 which are patent disclosure sheets on which Bill Rusch disclosed what he calls another method for positioning spots on the TV screen.

Q. Does that bear a date?

A. No, it doesn't. It references a number of dates, but this particular piece of paper is handwritten and doesn't bear a date.

Q. I direct your attention to the lower right-hand.

A. Yes, I'm sorry. There is a pencilled-in date which is in my handwriting but is certainly something that I added from memory to sort of identify when that might have been written somewhere in my gathering the paper work. That isn't necessarily the date that that piece of paper --

Q. Was a later copy of Exhibits 9-130 through 9-173 made, and I refer you to Exhibits 9-197 through 9-223?

A. What, 97?

Q. Yes.

A. Yes, it was.

Q. Could you identify Exhibits 9-197 through 9-223, please?

A. 9-197 appears to be a typewritten copy of the patent disclosure sheet, 9-130. This time a docket number has been assigned to it, Sanders Docket No. D-2580, and it is properly signed all around, witnessed, and in addition to that, it appears as though that portion of 9-199 through 223, which was handwritten before in the earlier report, hasnow been -- I'm sorry, those numbers should have been 9-137 through 173.

Q. Now, 173 and 172, 171, 170, 169, 68, 67, 65 are all diagrams, are they not?

A. Yes, they've been retained in the original handwritten form, so let's do that once more. What was handwritten before started at 9-137 and went through 9-164 that now appears to have been typed up, and we have that numbered as pages 9-199 through 214. There appear to be some differences at first glance. I think, Mr. Welsh, you can't do this hurriedly. I think we'll have to go page by page to see how much got changed by the time the handwritten version was submitted

and the typed one was submitted, because I am beginning to see differences as I try to relate ~~through~~ the pages.

MR. WILLIAMS: Could you read the last question?

(The last question was read back by the reporter.)

THE WITNESS: Having compared pages 9-199 through 9-214 with 9-132 through 9-164, I find that the first set of pages is a typewritten exact copy of the handwritten, partially handwritten, pages which were generated earlier but not dated.

Q. (By Mr. Welsh.) What is the date of the patent disclosure sheet, 9-197?

A. 2 February, '68.

Q. And did you sign that?

A. Yes, I did.

Q. Or is that your signature that appears in the lower left portion?

A. Yes, it is.

Q. Does the date appear beside your name?

A. Yes, the same date, 2 February, '68.

Q. Do you recognize the other signatures on that page?

A. Yes, I do, Mr. Harrison's, Mr. Rusch's.

18 Q. Does this disclosure with the copied typewritten material that is copied from the Exhibits 9-132 through 9-164 include any reference to rebounding?

A. I would have to look through the material. I don't know without carefully reading.

19 Q. I refer to paragraph 8 on page 11 of that report which is Exhibit 9-207.

A. Yes, that paragraph references wall bounce.

20 Q. And also paragraph 10 on that same page, Exhibit 9-207?

A. That is correct.

21 Q. Now, referring to Exhibit 26-19, is that not a progress report of project NKM dated 1/2/68 and prepared by Mr. Rusch?

A. Yes, it is.

22 Q. Could you read what appears under the heading "Program progress"?

A. Yes, it says here, "Additional operating modes. (Rebounding, shrinking target size) display circuitry was developed and demonstrated."

23 Q. Now, that is a report for the month of December, 1967, is that correct?

A.

A. That's correct.

24 Q. And the previous report, Exhibit 26-20, was a report of the progress during the month of October, 1967?

A. That's right.

25 Q. Would it not appear, then, that the rebounding had not been achieved when Exhibit 26-20 was prepared on 11/7/67?

A. It appears that way, but I think it is easy to check on it, because three of Rusch's notebooks are references on 9-197, and there you'll find a blow by blow description of the daily entries of what was done and when, so, certainly, if you want to pin down the date when the rebound was done...

26 Q. Those notebooks have been produced, have they not?

A. Yes, they're in this room.

(Document handed to Mr. Welsh by Mr. Seligman.)

27 Q. (By Mr. Welsh.) And those have been marked as Exhibits 17, 18 and 19. I ask you to refer to these, if you would, and see if you could tell us whether rebounding had been achieved prior to November of 1967?

28 A. Mr. Welsh, I have finished examining several pages in

Exhibit 17 and 18. At least at the moment it appears as if the first reference to rebound is in Exhibit 17, page 100, which is dated 10/18/67. It is the very last page in the book, Mr. Welsh. This describes rebound of a spot, of a moving spot from four stationary spots and describes the method for switching a spot with flip-flops so as to move it laterally or diagonally to make it rebound. Also discusses methods for making the spot move slowly by integrating the flip-flop wave forms with capacitors, and then it goes on to the next book, which is Exhibit 18, page 1. It discusses bouncing off ~~or~~ phantom spots that are off the screen in one example, and that description goes on to page 2 of the same exhibit, and, finally, on page 3, the bottom half, we begin to talk about ping pong, three spots, and show bounce off from pairs. The words here are "When the ball is hit by the paddle, it reverses the flip-flop reset." That's at the bottom half of page 3, 10/18/67. All these pages we've been going through were all done on the same day, so I guess the answer to the question when the rebound first occurred is probably 10/18/67.

Q. When you say first occurred, you mean first thought

of it or Welsh.)

A. First thought of, shown by Rusch in his books.

Q. These pages you refer to, do they indicate whether or not the actual circuitry was developed and demonstrated as referred to in Exhibit 26-19, which is the report for the month of December, 1967?

A. No, they don't.

Q. By referring to these notebooks or other documents, can you tell when that was done?

A. The chances are that referring to Harrison's notes of that same period will give us the answer to that question and those would be either part of Exhibit 9 or in Harrison's earliest brown notebook, which, I believe, is also at the other end of this table.

(Document handed to the witness by Mr. Seligman.)

THE WITNESS: This was just handed to me. It is Exhibit 25. Mr. Welsh, it looks as though Exhibit 25 won't help us, because although the cover is marked issued at 5/11/67, the first entry is 12 December, '67, so it is a couple months late. We'll have to go back to reference 9 and search through it.

Q. (By Mr. Welsh.) How about Mr. Harrison's loose notes, Exhibit 23?

A. Well, I'd be happy to look at those. I thought I was looking at Harrison's notes in Exhibit 9. Well, the first reference to ping pong, which necessarily involves spot reversal, is 23-112, dated 11/9/67, headed in Harrison's handwriting, "Ping Pong." The next sheet, 23-13, shows vertical controls, or what we now call English control of a ball spot, so at least we know that by early November the ping pong game was well underway, so that, again, points to reversal work having been done in early November, late October. Let me keep looking. This is as close as I can come to it in reference 23. If we go back to the 9 -- I'm sorry. I guess that's as close as I can come to the earliest dates. The rest of the documents I was just looking at are either undated or dated in early December.

Q. Well, I believe the question was when was the circuitry for effecting a rebounding first constructed. You pointed out references in Exhibits 17 and 18 to rebounding and in Mr. Harrison's notes to some circuitry for it, but the question is when was that circuitry actually

constructed?

A. Well, would you please give me the reference I gave you out of Exhibit 23 once more?

Q. 112 and 113.

A. The reason I wanted to go back to that is because, as I explained earlier, these notes of Harrison's are basically his bench lab notes, and they reflect bench activity. So when you go back to 23-112, which is dated November 9th, and you put that together with the schematic of the English flip flop on the next day, November 10th, you can see that he was well in the middle of building a ping pong game by November 9th. So if nothing else, at least on November 9th the hardware for playing a ball game which involves spot reversal was well on its way.

Q. But that does not indicate that it was completed or operated successfully?

A. No, you can't tell that from these references.

Q. Do any of the other documents either in Exhibit 9 or later ones of Mr. Harrison's notes, Exhibit 23, indicate the completion of construction of rebounding circuitry?

MR. WILLIAMS: I assume Mr. Rusch

said his documents indicate something, obviously. The document may indicate something very much different to the person who authored it than to Mr. Baer.

MR. WELSH: Yes. The question was can he tell from reference to these documents when the circuit was completed?

THE WITNESS: I can't tell except that, categorically, since we're dealing with pieces of paper that are almost certainly daily but almost hourly descriptions of bench activity, they reflected hardware that was on the bench and was being worked on, and as he goes on from circuit to circuit, that means that circuit worked. So at least by November 10th he already had rebound going and an English control going.

Q. (By Mr. Welsh.) Now, some of the circuits, specifically, that on Exhibit 23-112 and one on Exhibit 23-114 show an X pencilled over the circuit?

A. Yes, over part of the circuit.

Q. Do you know what significance that has?

A. I can guess, again, but on 23-112, for example, he seems to have crossed out the diode ANDing ~~ending~~ function circuit and replaced it with a collector or-ing

function in the schematic and the dotted lines right below the crossed out schematic.

Q. So this could indicate just his mental designing of the circuitry, could it not?

A. It could. I don't know.

Q. Now, referring to Exhibit 18, in the first few pages of that exhibit as well as page 100 of Exhibit 17, there are entries on those pages, are there not, different inks and pencil, is that correct?

A. That's correct.

Q. For example, on Exhibit 17, page 100, there's a blue ink, apparently a ball point, and a red ink of wider lines, apparently a felt tip; is that correct?

A. That's right.

Q. Do you know if all of those -- can you recognize Mr. Rusch's handwriting, first?

A. Yes, I do.

Q. Do all of those entries appear in his handwriting?

A. Yes, they do.

Q. Now that you are looking at page 100 of Exhibit 17 when you answered that question, is the same thing true with respect to the entries of pages 1, 2 and 3 of Exhibit 18?

A. Yes, it is.

44 Q. And how about on the inside cover? I guess it's the sheet facing toward page 1.

A. That's also Rusch's handwriting.

45 Q. All of the written entries on that page?

A. All except the word egg time. That doesn't look like anybody's handwriting that I recognize.

46 Q. Page 1 of Exhibit 18 includes entries in blue ink, green felt tip, red felt tip, and pencil, does it not?

A. Yes.

47 Q. You know whether those entries were all made at one time or could they have been made at different times?

A. It's very unlikely they were made at different times. Rusch is in the habit of highlighting features in notes he makes by using different pens, different colors. It is his style. I find it reflected in every other piece of paper we've had in front of us.

48 Q. The different entries could have been made at different -- on different dates?

A. They could have, but I don't see why. They are clearly explanatory notes that show what he had in mind.

49 Q. To summarize, is Exhibit 26-19, which bears the date

52 Q. of January 2, 1968, the earliest document to indicate

that circuitry for rebounding was developed and demonstrated?

MR. WILLIAMS: I object to the question.is the earliest document. Is it the earliest document Mr. Baer has looked at this morning?

50 Q. (By Mr. Welsh.) That we've discussed this morning or that you've been able to find.

A. Would you please re-read that?

(The last question was read back by the reporter.)

THE WITNESS: Where is 26-19? Well, I don't want to be evasive, but I thought the whole purpose of what we did here in the last five minutes was to see whether there were references to earlier dates, and I thought we had found references in Harrison's notes that date back in November that show that that circuitry was built.

51 Q. (By Mr. Welsh.)I believe you stated that indicated to you it was being built at that time, and did you say in December?

A. No, in November. Specifically, 23-112, 11/9/67. November 9, '67.

52 Q. All right. And there's -- you were unable to find any

document indicating completion of that circuitry?

A. No, I could only infer that it was completed, because we've a daily blow by blow description of what he built. These are lab notes.

53 Q. Do any of his notes of a later date show any activity in circuitry for rebound?

A. Yes. If you will give me a minute, there is a bill of material here dated November 13, '67, Exhibit 23-116, 117, and the schematic, 118. Let me analyze that. I'll tell you whether it had rebound on it.

Yes. I am having trouble interpreting 23-118, which has all the elements of a rebound game, because in the upper right-hand corner on the right-hand side in the middle are shown two flip-flops which are capable of reversing the direction in which spots are moving and are generated by the spot generator in the center of that sheet, but I am trying to find where the trigger signals come from that would initiate the toggling of those flip-flops, and, therefore, the spot motion reversal, because some of the points on the schematic aren't identified as to where they go.

54 Q. That's not a circuit diagram, then, of a completed --

A. Oh, no, I wouldn't say that at all. It is a circuit diagram that's associated with a bill fo material dated 11/13/67, 112-116.

55 Q. How do you relate it to Exhibit 23-116?

A. Again, it is stapled to it, and I assume that if we look through the parts count on the schematic it will tell you the parts listed in the bill of material.

56 Q. Do you know whether they were stapled together when you accumulated these papers?

A. I don't know for sure, but it is more than likely, yes.

57 Q. In fact, assuming they were stapled together and the parts identified on Exhibit 23-116 and 117 correspond to the parts on Exhibit 23-118, does that indicate that these parts were going to be ordered?

A. No. The reverse is the case. It is a summary of what was in the hardware to give us a quick cut at adding up the material cost.

58 Q. May I direct your attention to the fact that there are transistors on the two circuits at the upper left and middle left of Exhibit 23-118 bearing the number 2N5139 which do not appear at all on Exhibit 23-116?

A. You have 5130. What looks like 34 is listed as Q-11,

Q-12, Q-13 on 23-116.

59 Q. Also, may I direct your attention to a notation in the title block of Exhibit 23-116 to dot gen, g-e-n, and to the circuits in the central portion of Exhibit 23-118 which do show transistors bearing the number 2N5134 appearing on Exhibit 23-116?

A. That's correct.

60 Q. Would that not indicate that this parts list is simply for the dot generators and does not include the flip-flops?

A. It appears that way.

61 Q. Also, the parts list calls for twelve diodes in the second line, and the two dot generators include more than twelve diodes, do they not?

A. The two dot generators plus the vertical and horizontal sync circuits, without which they wouldn't function, add up to twelve diodes. Now, wait a second. Let me take another look here. If you count the diodes that are labeled HF1, HF2, VH1, VH2, it is more than twelve.

62 Q. So we really can't say that Exhibit 23-116 is complete with respect to dot generators of Exhibit 23-118, can we?

67 A. Well, it is not one for one correspondence.

63 Q. And, also, is it not true that the reference symbols in the second column on Exhibit 23-116 do not appear in the dot generator portions of Exhibit 23-116?

A. That's right.

64 Q. 118, I'm sorry.

A. That's correct.

65 Q. Is it not correct, then, these Exhibits 23-116, 117, 118, do not necessarily relate to each other or indicate completion of the rebounding circuitry by the date 11/13/67 of Exhibit 23-116?

MR. WILLIAMS: Again, I think Mr. Welch means to imply what the documents mean to you, not necessarily the author of the documents.

THE WITNESS: It is purely guesswork.

66 Q. (By Mr. Welsh.) I believe you were looking for any other documents in December that would indicate completion of the rebounding circuitry?

A. Well, as I look through these, Mr. Welsh, the proper place to look is October and November, because by the time I get to November I already see evidence of circuitry that's quite a bit advanced over the basic ping pong game.

67 Q. What exhibits are you referring to, specifically?

A. For example, 23-132 shows integrators and differentiators, which are used in much more complex games in which the ball motion is a function of how hard the ball is hit by a symbol and a function of the direction in which the ball is hit by the hitting symbol, and that's several months advanced over the basic ball game. So the fact that I can't find them, the references we were looking for, doesn't mean they don't exist. They must have been earlier than November or December, for that matter, simply because we were quite a bit down the line in terms of work here on November the 21st and 22nd on 23-132. Unfortunately, the schematics that show the rebound are undated. Maybe we ought to take another look through all this paper work here and see if we can find a reference we missed. It is up to you.

Q. Well, I'd like to know what documents exist, if any, to show completion and testing or demonstration of the rebounding prior to this document, 26-19 of January 2, 1968?

A. Give me another three minutes to, once more, go through Exhibit 9 and 23 and see if I can come up with something I missed before.

Well, I give up, Mr. Welsh. There is a dated schematic, 12/22/67, Exhibit 19-118 which is an over-all schematic of a game incorporating all the features of a hockey game or a ping pong game, so at least by 12/22/67 we had long since finished the hardware, because, again, as shown on 9-117, we were well into the next generation, series, of games which we came to call DEDT, differential with respect to time, games. So although I can't show you the document, it certainly indicates that all the basic ping pong work, which includes ball bounce, was done in either November or maybe even October.

Q. Are the more complex circuits of Exhibit 9-117 incorporated into this over-all schematic of Exhibit 9-118?

A. No, I think there are four schematics here which are out of order. 9-117 goes together with 9-120, whereas 118 and 119 make a pair. 118 and 119 refer to a piece of equipment which was built and can play standard ping pong games, among others, whereas 117 and 120 describe elements of one of the more complex games requiring integrators or differentiators for imparting the more complex motion to the ball that I described earlier.

MR. WILLIAMS: May I see those notes?

THE WITNESS: Sure.

(Documents handed to Mr. Williams by the witness.)

70 Q. Now, you say the apparatus in Exhibit 9-18 and 9-19 was actually built?

A. Yes.

71 Q. Is it still in existence?

A. Yes, I am quite sure it is in this room.

72 Q. Would you please select it for us?

A. Yes, I will. Off the record.

(Discussion off the record.)

(Whereupon, at 11:20 o'clock, A. M., a short recess was taken.)

AFTER RECESS 11:35 A.M.

73 Q. (By Mr. Welsh.) Mr. Baer, I believe when we recessed you were rearranging the papers to make sure they were in the right order. Did you complete that?

A. Yes, I did.

74 Q. You stated that the apparatus shown in Exhibits 9-118

and 9-119 was actually constructed, is that correct?

A. Yes.

75 Q. And I asked you if that was still in existence and if you would produce it. Do you have that apparatus?

A. I thought I did, but looking at 9-118, I wonder whether I picked the right one. If you'll give me another two minutes, I'll look at some of the other hardware in this room and see if I can doublecheck something.

What I am trying to do, Mr. Welsh, is identify the piece of hardware which has a piece of tape on it labeled No. 4 which contains a bread-board with spot generators of the level slicing type shown in 9-118 and in other places such as 23-120.

76 Q. I am sorry. Did you say 23-120?

A. 23-120. The problem is not a question of whether we built hardware; it is a question of segregating all the hardware we built at this time about that period and associate it with schematics. One of the problems in identifying box No. 4 is that quite a bit of the wiring has been cut off and changed, modified. It makes it very hard to trace. If you'd like, I can

A. tell you what's on it that corresponds to either 23-118

or 9-118.

Q. Are 23-118 and 9-118 the same?

A. No.

Q. Well, they are not the same. I realize that. Do you find circuits appearing on Exhibit 23-118 that also appear as part of the circuitry on 9-119?

A. I think it is 9-118, Mr. Welsh.

Q. I'm sorry. Excuse me.

A. Yes, they do, but 9-119 is a later schematic in the sense that it has additional circuitry. It provides for three spots vs. two on 23-118 and has -- 23-119, or 118, rather, I'm sorry. 9-118 has an English flip flop, all the reversal mechanisms of a ping pong game on it, whereas we were in trouble earlier here this morning trying to find out on 23-118 just what triggered the flip flops that are on the schematic and are meant for reversing ball motion, but what I meant when I said they are identical circuits here, I meant the spot generators are identical, and they are in this hardware you see here I'm holding in my hand, at the center of the board.

Q. How many spot generators are there?

A. Well, it appears that there are at least three here.

Q. Before you go farther --

A. No, I am wrong. There are -- yes, there are three spot generators.

Q. Now, before you go farther, could we have this box which bears the number 4 marked as Exhibit 30?

(Whereupon, the box above-referred to was marked Sanders' Exhibit No. 30 for Identification.)

Q. (By Mr. Welsh.) Again, before you go further, would you identify Exhibit 30 for us, please?

A. Exhibit 30 is breadboard built into an aluminum chassis roughly six by ten inches by an inch and a half high, on the inside of which is a piece of printed circuit board on which a number of components are mounted. There are also some switches mounted on a board attached to one edge of the chassis. In addition to that, cables project from one side of the chassis which terminate in three sets of controls, two sets of which have vertical and horizontal spot positions controls and an English control for player operation, the cables being six or eight feet long to allow people that far apart to play. There appears to be another cable coming out of this bundle of cables with a plug at the end that, I guess, was plugged into a rifle

at one time. There are two additional controls fairly close to the chassis at the end of a cable whose purpose I don't remember.

84 Q. Was Exhibit 30 built for any particular purpose?

A. Well, certainly, it was built to play television games.

85 Q. Does it represent a milestone, as you referred to it yesterday, I believe?

A. That's my problem, Mr. Welsh. I am trying to identify, to decide whether this box represents the box we used for demonstration later to cable people or whether that's not the box. It's been cut up so badly that it is hard to tell.

86 Q. Now, referring to Exhibit 23-119, in the upper right-hand corner -- that's 23-119?

A. Yes.

87 Q. There's a notation in blue ink on it, what appears to be a Xerox copy of circuitry. Did you place that blue ink entry on that exhibit?

A. Yes, I did.

88 Q. What's the entry?

A. It says here, "Box No. 4 prior to installation of CATV H. and V. sync pick-offs."

89 Q. When did you put that notation on Exhibit 23-119?

A. I don't remember, but I guess in the process of assembling papers a few years ago.

90 Q. Do you recall how you happened to come to place the notation on there?

A. Again, guessing, Mr. Welsh, in attempting to identify which schematic relates to what piece of hardware and, in turn, relating that to when those pieces of hardware were demonstrated and to whom. We had more time than I have right now. The note says that I identified this as the hardware in which we removed or by-passed horizontal and vertical sync, because for the CATV demonstration we had to extract that from the TV set, itself. It was just possible that this connector had something to do with the sync extraction, but I am guessing. I will have to trace all the circuitry and double-check that.

91 Q. Was box No. 4, which is now Exhibit 30, in its present condition when you added that note to Exhibit 23-119?

A. More than likely.

92 Q. Did you at the time you made that note make a comparison between the circuits shown on 23-119 and the actual parts of Exhibit 30?

A. I am sure I must have. How thoroughly I did I don't know.

93 Q. Now, on Exhibit 23-120, in the upper left-hand corner, appears a notation. What is that notation?

A. The notation reads CATV demo box.

94 Q. Who put that notation on there?

A. It appears to be Rusch's handwriting.

95 Q. And that's placed in pencil, is it not?

A. Right.

96 Q. But you did not put that on there?

A. No, it must have been put on there way back when, because Rusch, Harrison and I were all involved in demonstrations to CATV people. Oh, yes, of course, the light's just dawned on me.

97 Q. What light is that?

A. O. K. It's 23-120. At the left-hand margin you see a circuit you never saw before. Under the words horizontal sync circuits you see what amounts to an emitter follower, ~~in the words~~, whose base is tied to a one-inch square copper plate, and then down below you see a CL705 photocell. It's a Cladrex photocell, tied to an emitter follower, and then you see the outputs from the two respective circuits entering

horizontal and vertical saw-tooth generators respectively. Those were the interfaces to the TV set which we used for CATV demonstration to extract sync, horizontal and vertical sync, from a set. In order to play a game when there is a cooperative TV program coming in over the cable or over the air, you've got to be in synchronism with the program. You don't generate your own sync. In order to get that sync we used a ~~exhaustive~~ capacitive probe which is that copper square for exacting horizontal sync and a photocell looking at the Raster on the C.R.T. to extract a signal that is useable as a trigger for the vertical saw tooth generator and in that fashion were able to lock in a horizontal saw tooth generator and a vertical saw tooth generator to the transmitted signal. What we did in those demonstrations was, actually, tune in a cable station and extract sync for the TV game in this fashion. I think that system of extracting sync is in 480.

98 Q. Can you see if that is the case?

(Document handed to the witness by Mr. Welsh.)

A. Yes. THE WITNESS: Yes, it is in figure

7 on 480; we show the photo electric pick-off of vertical sync, and in this case an inductive rather than capacitive pick-up. Same idea, pick-up of field that relates to horizontal sync in the vicinity of C.R.T. What you are really picking up is a radiated fly-back pulse. The fly-back pulse is from the deflection coils or the horizontal output transformer in the TV set.

99 Q. (By Mr. Welsh.) Do you need such interfaces when you are not connecting the game to a TV set that is receiving a signal from the cable?

A. No, you do not.

100 Q. Are the interfaces present in Exhibit 30?

A. It is very difficult to tell, Mr. Welsh.

101 Q. In the games that you've been describing, such, for example, as the one represented by Exhibit 29 -- no, Exhibit 28, which I believe you intended just for connection to a television set that was not receiving a signal transmitted from a cable, is that correct?

A. Right.

102 Q. You had had sync generators, horizontal and vertical sync generators, did you not?

A. Yes.

103 Q. In apparatus such as that of Exhibit 23-120, where you extract horizontal and vertical sync signals from the transmitted signal, do you also have separate horizontal sync generators such as you had in Exhibit 29?

A. Well, yes, we do. If you want to classify the saw tooth generators on 23-120 as sync generators, which in a sense they are. First of all, they're running at the sync rate, being triggered from the external sync signals coming from those two pick-offs. They're called bias sync generators, but sync, specifically a sync pulse, is not needed for Rusch's slicing system. The synchronous wave form is, but not a sync pulse. A sync in a saw tooth wave form, but not a sync pulse is needed. That's what the schematic shows.

104 Q. Is Exhibit 23-119 the same as Exhibit 23-120 except for the addition of these two circuits that you described for extracting horizontal and vertical sync from the transmitted signal?

A. Yes, sir.

105 Q. It further appears that Exhibit 23-19 was copied from a portion of Exhibit 23-120. In other words, except for those parts which were added for the cable TV,

the two exhibits, one is actually a copy of the other, is it not?

A. Yes. By copy you mean a Xerox copy?

106 Q. Yes. A literal reproduction?

A. Well, it's a scaled down reproduction, reproduction scaled down from B size to A size.

107 Q. So that 23-119 was made from 23-120 before the parts for the CATV were added?

A. Added, that's correct.

MR. WELSH: Off the record.

(Discussion off the record.)

(Whereupon, at 12:00 o'clock, noon, a recess for lunch was taken.)

AFTER RECESS 1:35 P. M.

108 Q. (By Mr. Welsh.) Am I correct that Exhibit 30 was produced as the apparatus which was constructed in accordance with Exhibits 9-119 and 9-118?

A. Yes.

MR. WILLIAMS: Mr. Baer, the question is to his exhibit, I believe, rather than

Exhibit 23 which is what you're--

THE WITNESS: 9-118, I believe, is a reuse of Exhibit 30. Exhibit 30 has been used before as shown in 23-119 at an earlier date.

Q. (By Mr. Welsh.) Now, I believe 23-119 does not bear a date?

A. I'm sorry, yes, it does. 23-119, you are correct, does not bear a date. 23-119 we agreed was a predecessor of 23-120 in that 23-120 had the horizontal and vertical sync extracting circuits added, and during the lunch period I inspected Exhibit 30 some more and very definitely tied down that that box, indeed, is that circuitry which is represented by 23-119. And then, in terms of time, 23-120 must have followed 23-119 by the addition of the sync extracting circuitry which lived on some other board which is no longer inside the physical unit, Exhibit 30, and my reconstruction, to get back to your question, is that after we used the unit for demonstration in early January in conjunction with the CATV, we went in and converted it for use with ordinary TV sets by either putting back in or adding an R.F. oscillator summer as shown in 9-118 in the lower left-hand corner. What

I can't see is whether we took it out in the first place to accommodate the CATV demonstration and put it back or whether we put it in after the CATV.

110 Q. Now, you say that's the R.F. --

A. R.F. oscillator and modulator which wasn't necessary for the cable demonstration, because there we used a crowbar modulator.

111 Q. Now, the R.F. oscillator and modulator that you were just referring to, that appears at the lower left corner of 9-118?

A. Yes, it is.

112 Q. Do 23-119 and 23-120 accurately depict what was in the unit which was demonstrated to the CATV people?

A. Yes, they do.

113 Q. And does Exhibit 30 constitute that unit which was used in the demonstration?

A. Yes, it does.

114 Q. So that, then, the demonstration unit is accurately characterized by Exhibit 23-118?

A. The unit which is on the table here before us is accurately characterized, because, coincidentally, it has the same parts missing that are also missing on the schematic. 23-120 is, really, the total

schematic of what was demonstrated a month later through the addition of the sensor circuits.

MR. WELSH: Now, this morning there was produced for us another model. Just for identification purposes, I'd like to have this marked as Exhibit 31.

(Whereupon, the model above-referred to was marked Sanders' Exhibit No. 31 for Identification.)

115 Q. (By Mr. Welsh.) I hand you Exhibit 31 and ask if you would identify that, please?

A. Yes, Exhibit 31 is the odd-even code spot decoder, which is also covered by the 480 patent which we discussed in yesterday's testimony.

116 Q. Were you the one who brought this model or found it to bring here?

A. Yes, it's been in either Harrison's or my possession all these years. You mean physically brought it recently?

117 Q. Yes.

A. Yes. I think it turned up -- I thought it was here as part of the exhibit, but it turned up somewhere in our lab area, and I brought it in as part of the record.

118 Q. So you had intended, actually, to include it with the other materials?

A. Yes, I don't understand why it wasn't with the rest of the hardware material.

119 Q. Do you know what relationship, if any, the circuitry of Exhibit 23-119 and Exhibit 30 has to the 284 patent?

MR. WILLIAMS: Could you define what you mean by relationship?

MR. WELSH: Well, whether any of the parts that are included in Exhibit 30 and shown on Exhibit 23-119 are also included in the 284 patent.

THE WITNESS: Without examining 284 to refresh my memory, I can say categorically yes, because such elements as the English flip-flop certainly reappear in 284, but the slicer circuits, I don't know where they show up. If you like, I'll look at 284.

Here is the 284 patent.

(Document handed to the witness by Mr. Welsh.)

THE WITNESS: The answer to your question is yes, 284 is the patent that contains the slicing scheme for generating spots. It also

discloses elements of a what came to be known as an English flip-flop. 284 also shows a horizontal saw tooth generator which is virtually identical to that shwon on 23-119 in the upper left-hand corner. It also contains similar means for summing video signals prior to the application to the R.F. oscillator for modulation purposes. There are other minor similarities, also, a control pot under figure 9A in the patent.

120 Q. (By Mr. Welsh.) Can you tell by examining the 284 patent if there are parts that are disclosed in it that are not present in Exhibit 23-119?

MR. WILLIAMS: I object to the question. The patent is before us. It speaks for itself, and he's testified as to what is in 23-119. I think anybody can make that comparison. You are asking the witness about a patent which he is not an inventor. I don't see the point in having this witness make that comparison.

121 Q. (By Mr. Welsh.) If he knows any elements, I'd be interested. He said he was very closely associated with the developments leading to his various TV game structures on a daily basis, and if he knows as a

A.

result of that, I believe it is a fair question.

MR. WILLIAMS: I think you are right. He has testified that he's been closely associated with the developments. He has not testified, that I recall, that he was closely associated with the patenting of the 248 patent or what was included in that patent or what was disclosed, and that's the comparison he's being asked to make.

122 Q. (By Mr. Welsh.) Are you aware of any of the circuitry in the 284 patent that is not present in the Exhibit 23-119?

A. Yes.

123 Q. What are you aware of in that regard?

A. Those circuits that relate to more advanced circuitry such as that shown in 9-117 and 9-118. I'm sorry, 9-117 and 9-119, 9-120.

124 Q. I think you said that was in 9-119, and those are the integrators and differentiators that change the ball motion as a function of how hard the ball is hit?

A. Yes.

125 Q. I'm not sure I got all of the exhibits where you stated that circuitry, was it 9-117, did you say?

A. Yes.

126 Q. And 9-120?

A. Yes.

127 Q. And were there others?

A. Yes, 9-119, block diagram.

128 Q. Are there any other elements in these -- strike that. Do these exhibits, 9-117, 9-119 and 9-120 include any elements that are not in the 284 patent?

MR. WILLIAMS: Any elements of which you are aware.

THE WITNESS: I can't possibly tell offhand without reading the patent.

129 Q. (By Mr. Welsh.) Mr. Herbert recalls that you said that there are elements in Exhibit 9-119 that are not -- Mr. Herbert recalls that there are elements that are in the patent but not in Exhibit 9-119.

MR. HERBERT: I think that he indicated earlier that there are items in the patent which are shown in Exhibits 9-117, 9-119 and 9-120, but are not shown in 23-120.

MR. WILLIAMS: Testimony was that it was 23-119. That's the way I have it recorded.

130 THE WITNESS: It doesn't matter. I know what I said, what I meant.

130 Q. (By Mr. Welsh.) Would you mind repeating that, please?

A. I think what we said this morning is that 23-119 or 120, it doesn't matter which, reappear in part on 9-119 in the sense that the dot generators and saw tooth generators are a feature of both, all three of those references, but that, really, 9-119 is the next generation of equipment, if you will, and is in a different class from either 23-119 or 120. The real subject of 9-119, 120 and 117 is the more complex methods for handling the ball motion.

131 Q. And is it not correct that those elements are shown in the patent but are not shown in the Exhibit 23-119 and 23-120?

A. That's right.

132 Q. Other than those elements, is there anything in the 284 patent that you are aware of that is not shown in Exhibit 23-120?

A. Not that I can recall, with the exception of the games that I described in 284 which are, clearly, not on the schematics.

133 Q. Would you mind repeating those games?

A. I believe the 284 patent contains references to

ping pong, baseball, hand ball, other sports games, both in the body and in the claims, and, of course, those games are not specifically identified on the schematics as such.

134 Q. Such as Exhibit 23-120?

A. Or, for that matter, 9-119, 117 and 120.

135 Q. Although those games are not mentioned on these schematics which you have just identified, could the games or were they actually played on the circuit of Exhibit 23-120?

A. Again, you are taxing my memory with respect to what's in 284. Certainly the ping pong game was played with the equipment of which 23-119 is a representative schematic and 23-120, also. What other games 284 contains were also playable with the equipment in 23-119 I don't recall at the moment.

136 Q. But at least ping pong was?

A. Yes.

137 Q. Referring, now, back to Exhibit 26, we still have not identified pages 26-21 through 26-29. Could you do that for us, please?

A. 26-21 is a financial report which indicates the amount of money that was budgeted for task NKM and

the amount of money that had been expended to date, the date being 8/30/68. No, the numbers pertain to expenditures through the month of July, '68, the end of July. It shows dollar figures for both the budgeted amount and the actual expenditures. 26-22 is dated July 22, '68, and it appears to be a back-up sheet ~~for~~ from which 26-~~22~~ 21 was generated.

MR. WELSH: Could I have that whole portion regarding 26-22?

(The last answer was read back by the reporter.)

138 Q. (By Mr. Welsh.) I think you probably meant 26-21 was generated, did you not?

A. No, I figured out what this whole sequence is about just now. 26-21 is the last in terms of time, the last of all these documents going through 26-29.

139 Q. That is, 26-22 through 26-19?

A. If you started at 29 and worked your way backwards to 21, you'd find a record of expenditures on a monthly basis with 26-21, finally, giving you a cumulative picture of what had been spent up to that time since the beginning of the program. It is a monthly, with a few months missing, monthly financial

status report.

140 Q. Now, referring to Exhibit 26-21, do I read this correctly that total cost incurred both in the contract to the date of the report and the year to the date of the report was $20,450.00?

A. I'm just studying that myself, Mr. Welsh, and trying to figure out what that means.

MR. WILLIAMS: If you know, Mr. Baer. If you don't know --

THE WITNESS: Yes, I see it now. The answer is yes, because the numbers in both of those numbers, year to date and contract to date, is the sum of the two numbers under amount budgeted and under amount intended if you add up those two numbers. So $20,450.00 is the total cost incurred up to that point.

141 Q. (By Mr. Welsh.) And does that also show that the amount budgeted was $8739.00 and that the amount of expenditure is over the budgeted amount? It was $11,711.00.

A. Yes, I'm afraid so.

142 Q. Now, Exhibit 26-1 which bears a date of January 31, '68, is a stop order to the NKM task. Do I recall

correctly that you stated that the result of that stop order was to no longer, subsequent to that charge, make any charges against that account?

A. Well, in theory, at least, a stop order is supposed to enter the computer and automatically reject all charges that are entered against the task after that stop order date becomes effective.

143 Q. But Exhibits 26-22, 23, 24 and 25 do indicate additional expenditures after January 31, 1968, do they not?

A. They certainly do.

144 Q. Is there any particular explanation for that?

A. Well, the logical explanation would be that the task was opened up again.

145 Q. That Exhibit 26, however, does not contain any indication of that, does it?

A. No, it doesn't.

146 Q. Are you looking for other indications of that?

A. Yes, I haven't found any.

147 Q. If it were reopened, who would have reopened it?

A. IR&D office.

148 Q. Mr. Campman?

A. Mr. Campman.

149 Q. You wouldn't have had authority to do that yourself?

A. No, that's his ~~preference~~ prerogative, but it makes sense that that was done under the same task code, because we are in the middle of a fiscal year which ran, as I said yesterday, through July 31st, and since we already know that the work went on, there is, really, no reason for changing the task number. The stop order was a perfunctory thing that the computer spit out.

150 Q. And your fiscal year ended at the end of July?

A. That's right.

151 Q. '68. Did the reopening of the task code have anything to do with the demonstration of it to the CATV people?

MR. WILLIAMS: If you know, Mr. Baer.

THE WITNESS: I don't recall. The program was a continuing one.

152 Q. (By Mr. Welsh.) Referring to Exhibit 26-1, does that indicate that Mr. Campman approved the stop order?

A. I don't think it indicates that. I think, as I said a minute ago, a stop order is a, in many cases, an automatic machine function. When due dates or sometimes monetary limits are reached, the stop order is shipped out.

153 Q. His signature --

A. His signature appears on it 2/1/68. You are right. I missed that before. He did sign that off on February 1, '68, so it has Campman's approval.

154 Q. Do you know the circumstances under which that stop order was entered?

A. Not specifically. I guessed at it before.

155 Q. Would you mind repeating that?

A. I said that, more than likely, the circumstances that caused the stop order to be issued is when either funds expire or schedule dates are exceeded which might have been input into the computer to flag the funding office.

156 Q. Are the dates schedule shown on Exhibit 26-5?

A. Was the question are there dates?

157 Q. No, are the schedules shown on Exhibit 26-5?

A. Oh, yes.

158 Q. And what did those schedules show as the completion date of the task?

A. The schedule shows that the job was estimated to be completed at the end of November of '67.

159 Q. And it, in fact, went on beyond that?

A. Oh, yes.

160 Q. And that would be consistent with what you just said that, perhaps, the stop order resulted from exceeding the schedule?

A. Yes, or the money.

161 Q. Now, in connection with Exhibits 23-119 and 23-120, as well as Exhibit 30, there has been reference to CATV demonstrations. When or what were these CATV demonstrations?

A. The CATV demonstrations took place in the Canal Street building of Sanders Associates and demonstrated method of playing a series of games, including ping pong, on a TV set while the set was receiving pictorial, video, background information from a simulated cable station.

162 Q. Were there more than one demonstration?

A. Yes, sir, there were.

163 Q. How many demonstrations were there?

A. Three or four or perhaps more.

164 Q. When was the first demonstration?

A. I believe the first demonstration was in January of '68 to Mr. Hubert Schlafly from Teleprompter.

165 Q. Did he attend alone?

A. Yes, he did.

166 Q. Who was present on behalf of Sanders?

A. Bill Rusch, Harrison, myself. Let me amend that. I can't be sure whether all three of us was there. I can't be sure if Harrison was there. I don't know if Rusch was there for every one of the demonstrations. We were all involved in preparing the hardware, software.

167 Q. Who arranged the demonstration?

A. I did.

168 Q. How did you happen to arrange it?

MR. WILLIAMS: Excuse me. You mean his first demonstration.

MR. WELSH: Yes, limiting it to the first demonstration.

THE WITNESS: At the time it was thought that one viable way to get television games into the commercial mainstream was via its application or potential application to cable television, that is, playing TV games with a cooperative cable transmission. As a result of that notion, I studied available material on the cable industry, and since Teleprompter emerged from that study as the pre-eminent cable operator at the time, I got in touch with the principals. To

the best of my recollection, that first contact was with Mr. Schlafly who was then the vice president of Teleprompter.

169 Q. (By Mr. Welsh.) Was this done as part of an effort on your part to commercialize the TV games?

MR. WILLIAMS: I object to the question. What do you mean by the term commercialize?

170 Q. (By Mr. Welsh.) Do you understand the question?

A. Yes, if in plain English you mean by that was this an attempt on my part to see whether a business could be built around the TV game concepts and development and hardware, the answer is yes.

MR. WELSH: Could I have that answer back, please?

(The last answer was read back by the reporter.)

171 Q. (By Mr. Welsh.) Is that what you meant by your use of the phrase to get TV games into the commercial mainstream?

A. Yes.

172 Q. Did you have any responsibility in this respect?

A. Yes.

173 Q. How did that come about?

A. With respect to TV development, at least up to this point, clearly, no attempt had been made by anyone at Sanders to attempt to recover some of the expenses that were involved in carrying on the development activity up to that point, so it behooved me as a man who tapped the corporate till to show the corporation how the money that was spent might be returned in some fashion, hopefully with a profit.

174 Q. Did you assume this responsibility on your own or were you assigned to it?

A. I believe it is fair to say that that responsibility was implicit in the whole program. I didn't need to be told.

175 Q. There was no specific instruction or definition of the responsibility to you?

A. No, but I'm sure the conversation during those days repeatedly must have included phrases like, "Now that you have it, what are you going to do with it?"

176 Q. Did you feel that by this time you did have it?

A. I felt that we had a viable demonstration breadboard that showed the method of the techniques and could serve as a basis for product development.

177 Q. And that breadboard was what has been marked as

Exhibit 30?

A. That's correct.

178 Q. Was the CATV approach the first effort you made to see if a business could be built around TV games?

A. I don't recall. Certainly one of the first.

179 Q. Did you have any other approaches in mind?

A. I really don't recall.

180 Q. As of this time?

A. As of that point in time I don't recall. We were struggling for a definition of how to best get into a business that we could handle here at Sanders.

181 Q. When you contacted Mr. Schlafly, what did you tell him?

A. It ~~was~~ is impossible to remember in detail. In view of the fact that he came up here to see a demonstration, I must have presented the concept of TV games and its possible relation to cable TV, and even in those days, you may or may not recall, there was a great deal of talk about premium services over the cable, services other than a mere reproduction of over the air broadcast programs. I am sure I used that approach to introduce the concept to Mr. Schlafly. He seemed interested and he came.

182 Q. Could you describe what happened when he did come?

A. Yes, we had set up a demonstration in one of the shielded screen rooms on the sixth floor of the Canal Street building, not so much because we needed a shielded room, but because it was a nice open enclosure with some bench space and lots of free floor space. In the room we set up a small Sony TV camera. We connected the output of that camera to an R.F. oscillator which was tuned to either Channel 2, 3 or 4, I don't recall which. We took the output from the oscillator through a cable, and I recall coiling up many feet of cable around the bench to simulate a cable run between a CATV station and local subscribers' drop and then fed the end of that cable into a breadboard crowbar circuit which, in turn, was connected across the antenna terminals of a black and white or color -- I don't recall which, I believe it was black and white -- TV set. Attached to the crowbar circuit was the hardware contained in Exhibit 30. I remember having prepared a flip chart presentation which was sitting on an easel in the room which, among other things, listed the games we were going to play in sequence. And then we

proceeded to run through a demonstration of it game by game.

183 Q. Do you still have that flip chart?

A. I thought we did, and I looked for it in this room last night and could not find it, so my assumption is it is no longer in existence.

MR. WELSH: Off the record.

(Discussion off the record.)

(Whereupon, at 2:40 o'clock, P. M., a short recess was taken.)

AFTER RECESS 3:15 P.M.

184 Q. (By Mr. Welsh.) Mr. Baer, do you recall the games that were listed on the flip chart that you used at the first CATV demonstration?

A. Yes, in a main, I do. At a minimum, they included a chase game in which one spot was used to chase another, the game of a type that you saw previously referred to as "fox and hounds", or a game in which one spot disappeared if it were caught up with by another. There was a ping pong game. In between, as

a change of pace, we played a rifle game, target shooting. Either at this first meeting or subsequent two or three meetings with the Teleprompter people we had one or more of the board games, especially the thing that we call even-odd games which, really, required no more than moving two spots in accordance with a set of rules and in conjunction with an overlay on the picture tube. And, finally, we concluded the demonstration with a demo of the small unit we labeled Exhibit 31 this morning which was used to demonstrate methods of playing quiz programs over the cable with home audience participation via the little hand-held unit.

185 Q. When you just said, finally, you demonstrated Exhibit 31, did you mean at one of the later demonstration periods or at the end of the first demonstration?

A. At the end of the first demonstration.

186 Q. So that at the first demonstration you definitely had a chase game, the rifle or target shooting, ping pong, and the demonstration of the method of playing

A.

Q. quiz programs over the cable withaudience

A. participation using Exhibit 31, and I believe you

also indicated that there might have been one or more board games at that demonstration, the first one.

A. That's correct. I am sure we had more than four games and I could only enumerate four different games right now.

187 Q. How long did the demonstration last?

A. I can't recall exactly, but Mr. Schlafly arrived sometime in the morning and left sometime in the afternoon. Probably, between discussions, conversations, a couple of hours, maybe more.

188 Q. Did it extend over the noon hour?

A. I don't recall.

189 Q. In the chase game where one spot disappeared if another one caught up with it, was that a disappearance resulting from a change in color of the background or did the spot disappear?

A. No, as I said earlier, I don't think we had a color TV set. I think it was black and white to begin with, though I can't be sure of that.

190 Q. Do you recall what TV set it was?

A. No, sir.

191 Q. Was the Sony TV camera color or black and white?

A. Black and white, small, inexpensive camera of the

type used for industrial purposes.

192 Q. Could you describe the game of ping pong as it was demonstrated at that first demonstration to Teleprompter attended by Mr. Schlafly?

A. The game of ping pong, two player spots which later came to be called hitting spots.

193 Q. Came to be called what?

A. Hitting, h-i-t-t-i-n-g. They were manipulated on a screen by means of the vertical and horizontal positioning controls, which we earlier identified as being at the end of the cable ~~#~~ coming from Exhibit 30 which are still labeled H. and V. for horizontal and vertical, left in the case of one set and right in the case of the other set. A third spot appeared on the screen in response to a reset push button which, I believe, lived in a hole on one of these control panels that's now --

194 Q. There is a push button on the other one.

A. Oh, yes, there it is. That button is used to reset the ball action if the ball disappeared because one of the players failed to intercept it. If the player spot intercepted the ball, the ball would reverse motion, travel in the other direction with its speed

controlled by special circuit component values, but its vertical position controlled by the manual adjustment of what we call the English spot or English control, one of which is located, also, on the control strips at the end of the cables of Exhibit 30.

195 Q. Did each player have a button to reset the ball in motion after it disappeared off of one edge of the screen?

A. I don't recall, Mr. Welsh, whether we had one or two.

196 Q. Does the reset button appear in Exhibit 23-119? Or if it would be easier to look on 120, which is larger, as I understand it. That's 23-120.

A. There is a reset button shown, but I'm not sure how that relates to resetting the -- oh, yes, here it is. Coincidence triggered the S.C.R. I am looking for the way the flip flop is reset by the push button. This is the spot reset switch. It is labeled as such. Inspecting the figure 23-119, Mr. Welsh, it turns out that the reset switch isn't shown on this figure. The reset switch that is shown has to do with resetting the crowbar which is used during chase games, by which an intercept of one spot with another produces an

output from the circuit at the bottom right-hand corner, coincident circuit, and triggers the crowbar S.C.R. and then blanks video, makes the display disappear. But the reset button to retrigger the flip-flop in the bottom right-hand corner somehow isn't shown. Meanwhile, it had to be there because once the flip-flop gets hung up in one position which results in driving the ball off one side of the screen, one side or the other, there's no way to get it back on except to trigger the flip-flop by injecting a signal through those two .02 capacitors shown on 23-119.

Q. Then at least in that respect, Exhibit 23-119 is incomplete?

A. It seems to have a switch missing.

MR. WELSH: Can you read his last answer?

(The last answer was read back by the reporter.)

Q. (By Mr. Welsh.) Those .02 capacitors appear in the lower right-hand portion of Exhibit 23-119, do they not?

A. Right, the trigger capacitors.

Q. Yes.

MR. WELSH: Give me that part where

he reverted capacitors again, please.

(The referred-to answer was read back by the reporter.)

Q. (By Mr. Welsh.) Well, yes, if you were going to reset the flip-flops for recommencing the movement of the third spot, which is the ball spot, instead of injecting a single signal through both of the .02 capacitors on Exhibit 23-119, would you not just inject a signal through one of them?

A. No, sir, it is a standard flip-flop, and because one stage is saturated in a flip-flop one at a time, you can send trigger signals to both sides and it gets ignored by the side that's already on, and if it is of the right polarity, it then comutates or toggles the circuit to the other condition. It is a standard way of triggering a flip-flop with a sharp pulse. It goes back to the days of Eckles-Jordan. Fifty years ago you will find flip-flops built that way and triggered just that way.

Q. Are there in these documents any which show the reset switches for the ball?

A. You mean somewhere else?

Q. Yes.

A. In the various notes?

202 Q. Or, perhaps, in the later circuitry of Exhibits 9-118 or --

A. I haven't found it, Mr. Welsh.

203 Q. Are you looking at --

A. I'm looking at 9-118.

204 Q. I find a switch.

A. Yes, I saw that, too.

205 Q. Here on the right central portion.

A. That switch in the upper position, that switch sums the outputs of the player and the ball spots so that the coincidence between any two goes through that

208 Q. circuit and then triggers the flip-flop, so that is normal operating position. when that switch is down-

A. ward. It takes the ball spot signal to that lower schematic which terminates at a point called N, and I haven't found what N is or where N goes.

206 Q. Referring to page 54 of Exhibit 18, which is Mr. Rusch's notebook, that's an entry dated 11/3/67, is it not?

209 A. That's right.

207 Q. That contains the statement: "With ball games such as baseball or ping pong, if miss ball and it goes

off screen, must push button to 'get ball back into play.' This is sometimes an annoyance, so --" Then there is a schematic of a free-running square wave flip-flop with some other wave form drawings.

Q. Is it possible that the push button switches for the players returning the ball to play was not actually in the CATV demonstration hardware for that first demonstration?

A. It is just possible, but then the free-running oscillator which Rusch just -- you just read about in Rusch's book would have to be part of that schematic, and it isn't there, or I haven't found it.

Q. Were there any other ways to get the ball back into play?

A. In order to get the ball back into play, you have to retrigger the flip-flop. That provides the driving voltage and moves the ball across the screen, so it is a simple matter of having left off the same symbol through the succession of schematics by copying it from one to another and carrying the error forward.

Q. But you do have a previous recollection that ping pong was played at that first demonstration to Teleprompter?

A. Oh, yes, no question about that.

Q. And do you also have the recollection that at least one player had a push button to reset the flip-flop to get the ball back into play?

A. No, I don't have a recollection.

Q. Do I understand correctly, however, that you do feel there must have been something to get the ball back into play?

A. Yes. Give me another minute, Mr. Welsh. I just saw another switch I hadn't seen before on 9-118. I'll see if I can decipher that. It's in the right place.

(Discussion off the record.)

Q. (By Mr. Welsh.) Mr. Baer --

A. Yes?

Q. -- is it not possible that the values of the flip-flop time constant elements on Exhibit 23-119 are such as to provide a long period when the flip-flop is in one condition or the other, a period longer than it takes for the ball to travel completely across the screen, so that it would reset itself automatically or in response to coincidence with a paddle?

MR. WILLIAMS: That's not the exhibit he has. He has 23-119.

(Document handed to the witness by Mr. Welsh.)

THE WITNESS: When you ask whether the flip-flop could be free-running so that it would reset itself --

214 Q. (By Mr. Welsh.) Yes, over a long period.

A. Over a long period. Yes, it is possible that it did ~~have.~~ that

215 Q. And if that were true, then the ball would reappear from the same side it disappeared and be traveling in the opposite direction?

A. That's correct.

216 Q. In that event, then, the circuit would be complete?

A. Yes.

217 Q. When the --

MR. WILLIAMS: I think he's still examining Exhibit 9-119 to answer the previous question.

218 Q. (By Mr. Welsh.) Whether there was another switch?

A. Yes, I am still searching for a reset switch, and I thought I found it here. I am still trying to make the connection between one point of the schematic and another in order to be certain that the switch I

identified here is indeed a reset switch, because half of it, referring to 9-118 -- it is a gang switch. It is a switch connected to the coincidence circuit in the upper -- on the right-hand center of the page and when that switch, the upper part of that switch, bridges a resistor across another resistor, there is a positive pulse applied to the flip-flop which would definitely reset it. What puzzles me is what the function of the other portion of that switch, which is shown by dotted lines, to the switch we just discussed. That somehow deflects the ball signal, video signal, to another small circuit and puts it out at a terminal called N, and I can't find where N goes from that terminal. I'd better stop now before we spend all afternoon looking at 9-118.

Q. Was there ever any ping pong game in which there was only one switch operable by one player to reset the ball, or when you provided a switch for resetting

A. of the ball by a player you provided one for each

Q. player?

A. Well, since then in the later equipment we always had two switches, one for each other player. That obliterates my recollection as to how early we used

two switches or whether, indeed, there ever was a single switch. I don't recollect. We'd have to find the papers for me to refresh my memory. I don't know.

220 Q. Do you recollect whether a free-running flip-flop was used with a long enough delay to permit a ball to move completely across the screen so that it resets itself?

A. I don't remember that.

221 Q. Now, referring to Exhibit 23-119, was there some control provided to change from the chase type game to the ping pong type game?

A. There was a switch provided which allowed the crowbar S.C.R. to be inserted into the circuit which would react to the coincidence between any two spots so that the two players could be used for chase games. That switch is shown on 23-119 near the bottom. It is called on/off, just above the word video crowbar.

222 Q. In the lower central right portion of Exhibit 23-119?

A. That's right.

223 Q. Did anyone else attend the first demonstration at any

A. time other than Mr. Schlafly, you, Mr. Harrison and,

225 Q. possibly, Mr. Rusch?

A. Not that I recall, Mr. Welsh.

Q. Prior to the meeting, did you have in mind any way that a business could be built around TV games and hardware so far as cable television was concerned?

A. I believe I testified that in those years at the emergence of cable TV there was already a considerable amount of speculation with regard to premium services such as pay cable programs, movie programs, and other types of programs which were not simply the translation and transmission of existing broadcast material by the cable, and that my plans, such as they were, attempted to take advantage of what I felt was, hoperfully, an emerging market for specialty services in the cable business, and that in that context, possibly, viewers would not mind spending a sum of money for an attachment to their TV set which would enable them to play interactive games with programs available only on a cable channel. Certainly,

Q. in the beginning I had hoped that, perhaps, we could build such equipment here at Sanders.

A. And then sell it to --

Q. Well, sell it to whoever, possibly Teleprompter.

A. At least somebody in the cable TV business?

Q. Someone in the cable business who had an already

working relationship and business relationship with customers, namely, their subscribers, and so had a potential clientele ~~in~~ to whom they could address a new product.

Q. Did you make a proposal to Mr. Schlafly that Sanders build equipment and sell it to Teleprompter?

A. It is Mr. Schlafly.

Q. I'm sorry, Schlafly.

A. I can't tell which came first, whether the demonstration to Mr. Schlafly preceded the specific notions of just what to do in a business way or whether they evolved from discussions with Mr. Schlafly, but I'm sure that the answer to your question is yes because it seemed like a practical way to go into business.

Q. So you did it either before you gave him the demonstration or in the discussion after at that first meeting?

A. I would think so, especially since we prepared some rough cost estimates, and I'm sure we talked about such things as cost elements and what the price for such a piece of equipment might have to be by the time it arrived at the subscriber's home.

Q. Had you discussed this idea of yours with anyone here

at Sanders?

A. I don't recall, Mr. Welsh.

231 Q. Not with Mr. Campman or anybody like that?

A. It is possible, perhaps, even likely that I discussed it with Herb Campman somewhere along the line, but I have no record or recollection.

232 Q. Sanders did have acapability of manufacturing the hardware like this at that time?

A. Well, I thought, at least I think in retrospect,

A. that I must have thought we had the capability for making relatively small numbers of hardware at least for a start, and by start I mean during the initial phases when the whole concept would be tried out in the cable environment to see whether it was a viable product.

MR. WELSH: Could I have that last answer, please?

(The last answer was read back by the reporter.)

233 Q. (By Mr. Welsh.) Did anything happen as a result of that first demonstration and meeting with Mr. Schlafly?

A. I believe Mr. Schlafly sent me a letter thanking me

235 for the demonstration suggesting that Mr. Kahn, who *

was then president of Teleprompter, and also witnessed a similar demonstration, which eventually occurred.

Q. With respect to the ping pong demonstration, you stated that that had included a vertical movement of the third image constituting the ball or hit symbol, I believe you said you later called it. Would you describe what happens with respect to vertical movement of the ball and control by the operator or player?

A. Yes, the circuitry is so designed as to hand control over the vertical positioning of the ball spot, hit spot, to the player who last intercepted the ball with his player spot or hitting spot. As the ball returns in the direction of the oppenent a control which we called the English control is available to the player who last intercepted the ball. Through that control he can apply a D.C. voltage to the vertical positioning input of the ball spot generator and thereby fly the ball in a vertical direction to any part of the screen with respect to the vertical, the whole object being to maniuplate the ball around the opponent's hitting symbol so as to score.

Q. Did the ball ever move off the screen at the top or

the bottom?

A. I don't recall, specifically, what we did then.

Q. Do the elements by which the players applied the D.C. voltage to the ball generators to affect the vertical movement of the ball appear on Exhibit 23-119?

A. Yes, they do.

Q. Where are they located?

A. In the upper right-hand corner. The 25,000 ohm potentiometers shown in the upper right-hand corner.

Q. Are there actually four, are there not?

A. Yes, there are.

Q. There are four in the right-most portion of the circuit in the upper right-hand corner of Exhibit 23-119, and then there's still another 25,000 ohm potentiometer in the left-hand portion of that circuit, is there not?

A. Yes, there is.

Q. Do you know what all of those are for?

A. Looking at the schematic, it is clear that those pots are switched to cross the output of the flip-flop with a series of diodes shown there. I don't know what you would need the second set for.

Q. Are you looking for other circuit diagrams that might

explain that?

A. Yes, I am. Well, it certainly looks as though we had also built in an additional capability for moving the spot, reversing the ball spot's direction vertically. I understand it. I understand it. Yes, the light just dawned. Two of those controls, the ones attached to the vertical portion of the spot generator in the upper right-hand corner -- I am looking on 23-120, but I think the same applies to 23-119. Yes, it does. The upper two potentiometers which are attached to that part of that diode slicer spot generator circuit, which is driven from the horizontal saw tooth generator, are used to generate the horizontal motion of the spot in order to determine -- let's see whether it is centering or speed. I am not quite certain right now, but it is one or the other of the horizontal motion, the automatically reciproacting motion of the ball for which those two ~~parts~~ pots are used. And it looks like we finally identified the purpose of the two ~~parts~~ pots that are hanging from the short cable coming out of Exhibit 30.

Q. They control the speed?

A. They control, I wouldn't say, speed, but the centering

of the ball motion with respect to the C.R.T. screen. For example, if those parts were set to dead center between their extreme terminals, the amount of change of voltage at that point would be equal for each flip-flop reversal. The polarity would change, but the amount of voltage would be one half of the power supply voltage. If the arm of the potentiometer were further towards one direction or the other, there would be a larger positive or larger negative direction, and that helps to center the sweep of the ball over the screen. I am sure that was an arrangement to make sure that as the ball reciprocated it wouldn't start halfway across the screen and then go way off on one side or the other, but that was not a player control. It is indicated, also, by the short cable that it was mounted somewhere else and not accessible to the player. That was an adjustment that allowed centering of the spot motion, and since the whole thing is a voltage control spot, that makes sense, also. One has no absolute control over the characteristics of the diodes, for example, in a spot generator, so some form of preadjustment is necessary, and it looks like that

was it, whereas the two controls on the bottom of the upper right-hand corner sub-schematic, the ones that attach to B prime and A prime, are, indeed, the two player controls which we called English controls.

Q. Did the ball ever rebound off of anything other than the two player-controlled images in that first demonstration to Teleprompter?

A. I just don't remember. I don't think so.

Q. Now, you couldn't remember whether the ball moved off of the top or the bottom of the screen?

A. I remember that now, and it is implicit in looking at the schematic that it was able to go off the screen, because you'll notice that those English parts have no limiting resistors on either side. Therefore, the entire battery supply voltage was across them either of one polarity or the other minus some diode drops, and that amount of voltage certainly was enough to allow steering the spot off the top and bottom, and the main reason for doing that was simply that with respect to any monitor or TV set you never know just where you are. You have to have range to get within the viewing area on the screen, because most screens are overexpanded. You have got to be

able to cover the whole -- so in order to be able to be sure to accomplish that you just give the control more range than, really, necessary for the play.

Q. Then there was no rebounding off of the top or bottom of the screen?

A. No, no.

Q. Were there any other images on the screen other than the two player-controlled images and the ball image?

A. No, sir, that game was played against an overlay showing court outlines, I think, tennis court or ping pong court outlines.

Q. And there was no vertical line that would indicate the center of the ping pong table, for example?

A. I believe that was on the overlay.

Q. No other images indicating the blank surface such as a ping pong table?

A. No, not in this.

Q. Were the additions which were present in Exhibits 9-117 and 9-120 relating to the differentiation and integration containing the ball movement depending on how hard the ball was hit but which were not present in the circuitry of Exhibit 23-119 ever

incorporated into any working model?

A. Yes, they were.

250 Q. And when was that done?

A. In the same time frame, November, December of '67. The schematics relate to that piece of hardware, and I believe that's in the room here, also, that is, the hardware is in this room.

251 Q. That's the circuitry, 9 --

A. 9-117 and 120, and the block diagram 9-119.

252 Q. Was that hardware also demonstrated to the CATV people?

257 A. No, it was not.

253 Q. It never was?

258 A. It was not, no, never.

254 Q. All right. I'm not thinking just of the first time

259 when the hardware, Exhibit 30, was demonstrated. Was it at a subsequent time?

A. I understand. No, it was not demonstrated at subsequent times.

255 Q. That's demonstration to the CATV people?

A. To
~~Through~~ either Schlafly or Cahn or Teleprompter or any one of their people.

256 Q. Now, there was also another CATV company that a

demonstration was given to, was there not?

A. No, we invited and were visited by the individual who at that time ran the Nashua Cable Company who I knew slightly, for the purpose of discussing possible application of television games to the cable business since he lived in that business and had certainly had more experience than we did in the area, and as I recall, we had a single meeting with the individual, whose name, I believe, was Solomon, Harold Solomon, I believe, which resulted in no earth-shaking decisions.

Q. Did you --

A. He did not seem terribly impressed.

Q. Did you give him a demonstration?

A. I don't recall, but I don't believe so.

Q. Do you recall who attended that meeting?

A. I think, at a minimum, Harrison was there, and I believe Rusch was there, also. I also have a vague recollection with respect to having talked about application of Rusch's D.E./D.T. circuits. It is just possible in that connection we demonstrated the breadboard box that's based on or built from the schematics of 9-120 and 117.

MR. WELSH: Off the record.

(Discussion off the record.)

260 Q. (By Mr. Welsh.) When did Mr. Rusch commence to work on the TV game project?

A. I don't recall. He first joined the group -- by group, I mean he joined me and Harrison -- in connection with another project.

261 Q. What was that?

A. This is a guitar attachment that's described in one of the notebooks here which we had subsequently licensed out.

262 Q. He joined you for working on that project?

A. Yes, at least part time. I think to share Harrison' with some of the breadboarding. I can't be sure of

265 Q. that unless we refer to books and dates in the books.

263 Q. Could you do that and, perhaps, tell us, if you can, when he first came to work for you and when he first commenced working on the TV game project?

A. Mr. Welsh, looking through Rusch's notebook, which is Exhibit 17, it shows that he worked on his guitar concept quite a while earlier than the dates that we've

266 Q. been talking about, namely, back in March of '67, thereabouts, and I am at a loss to recall, and I

can't tell from thumbing through his notebook just when I learned about it, if, indeed, I knew about it then or later, when I decided to support what looks to me like a side project connected with absolutely nothing. It was officially bringing it under control, and possibly bringing it to completion and doing something with it, because the entries go through quite a few months, and I don't recollect him working for me on that program for that length of time, so I think you are going to have to ask Rusch just when he came on board.

Q. Now, the first entry with respect to TV games appears in that book. I believe it was on page 95.

A. That's correct. That's dated 9/25/67.

Q. And when did he first start on the guitar project?

A. Back in March of '67, because reference to music and frequency division are as early as March in the book here.

Q. Yes, on March the 2nd on page 20 there is a note at the top, "What about transient responses," and it says it just below that, "Botch up music?" So, certainly, he was concerned with music even then.

A. Prior to the September 25, 1967, entry on page 95 of Exhibit 17 and when Mr. Rusch was working on the guitar

attachment, where did he do that work?

A. By that work you mean the work on the guitar?

267 Q. Yes.

27[illegible] A. I don't know where it started if, indeed, any hardware was built, but after the work came under my cognizance [illegible] or I decided to pick it up, we carried the physical work on in the same room, which was a locked room accessible only to Rusch, Harrison and myself, on, I believe, the sixth floor, Canal Street, right opposite the elevator.

268 Q. And that's what you had trouble determining when his [illegible] work actually came under your supervision on the guitar?

A. That's right, or when I decided to make it my 27[illegible] [illegible] problem, because Rusch did work in one of my [illegible] departments right along.

269 Q. Now, when Mr. Rusch started to work on the TV game project, what was his relationship with Mr. Harrison?

A. Rusch at that time and to this date is a Senior Electronics Engineer, but Harrison at that time was classified either as a technician or an engineering assistant. Mr. Rusch is a graduate engineer. Mr. Harrison is not. So his relationship to Harrison

would have been that of engineer supported by a technician, the engineer being Rusch, the technician being Harrison.

270 Q. And in that relationship would they have or did they have different duties or functions?

A. In theory, at least, the engineer does the design work, the calculations associated with design practice. It doesn't necessarily work that way, because skilled

273 technicians do a considerable amount of design work in every electronics company.

271 Q. What happened between Harrison and Rusch?

A. In connection with the guitar, I think Harrison breadboarded some of the circuitry that Rusch had designed and, probably, helped Rusch debug it.

272 Q. And how about with respect to TV games?

A. Well, again, using the books to trigger my recollection, since Bill Rusch is a creative individual, too, we invited him to participate in what was,

274 basically, a creative project. He came on board and started right off. It didn't take him very long to learn what we had done and almost immediately decided that what we had designed could be improved upon, and that's when he came up with the voltage control slicing

circuits which start on page 96 of Exhibit 17. However, you are going to have to ask him whether his activity on TV games actually started on the date referred to by looking at the book, because he might have -- since he was physically present in the area at an earlier time, he might have -- I am sure he must have -- communicated verbally at earlier times on the subject of TV games.

273 Q. Well, I was interested, primarily, in your recollection of your observation of the way they worked and whether Mr. Harrison drew up most of the circuits. It appears that a lot of the circuit diagrams were drawn up by Mr. Harrison and very few complete circuit diagrams were drawn up by Mr. Rusch.

A. I don't know if I can draw any conclusions from that. Mr. Rusch is a very good engineer. He doesn't have to draw too many circuits. They usually work the first time around.

274 Q. Do you know whether he just built the circuits and then Mr. Harrison drew them or --

A. No, I would say that they worked together on the bench in coming up with such details and component values, for example. You are going to have to ask

them. I don't know exactly how they did it.

275 Q. Now, there were produced for us some documents relating to the communications of Sanders with Teleprompter and Merrimack Valley Cable TV. The cable TV documents were in a folder marked as Exhibit 22. At this time I'd like to ask you, Mr. Baer, to, if you would, see if these documents can be arranged in chronological order separated with respect to the Merrimack Valley meeting on the one hand and the Teleprompter meetings on the other hand.

(Documents handed to the witness by Mr. Welsh.)

MR. WELSH: I'd like to ask the reporter to mark each page in this exhibit as 22-1 through whatever it comes to.

(Whereupon, the pages of Exhibit 22 were marked 22-1 through 22-52 for Identification.)

Ralph H. Baer

Deponent

THE STATE OF New Hampshire)
) SS.
COUNTY OF Hillsborough)

Subscribed and sworn to before me this 10th day of May, 19 76.

Marilyn E. Trapalis
~~Justice of the Peace and/or~~
Notary Public

Marilyn E. Trapalis
Notary Public
My Commission Expires March 19, 1980